Home-based Health Monitoring System with Arabic/English Interface

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Problem Statement

People in the local community tend to ignore regular health checking. This has led to a wide-spread for diseases. Various factors are blamed and one of those is the lack of Arabic-supported health monitoring devices.

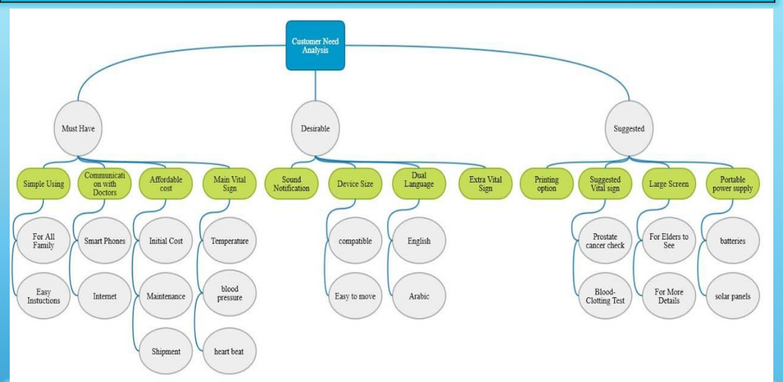
Project Definition

To Design and Build and Arduino-Based system that is able to acquire health vital-signs where they processed and analyzed into certain medical algorithms by the Arduino. Moreover, data acquired will be displayed in Arabic and English languages. Finally, the system will report user data automatically to an assigned healthcare centre to take an action based on the situation.

Project Objectives

- To help elderly people to deal with an affordable multi-measurement device for the purpose of improving healthcare system
- To develop our hand-on experience on hardware and software techniques for medical applications
- To prototype and build a tangible product that is easy-to-use
- To enhance research and presentation skills in order to present the technical work in a professional way

Customer Needs Analysis

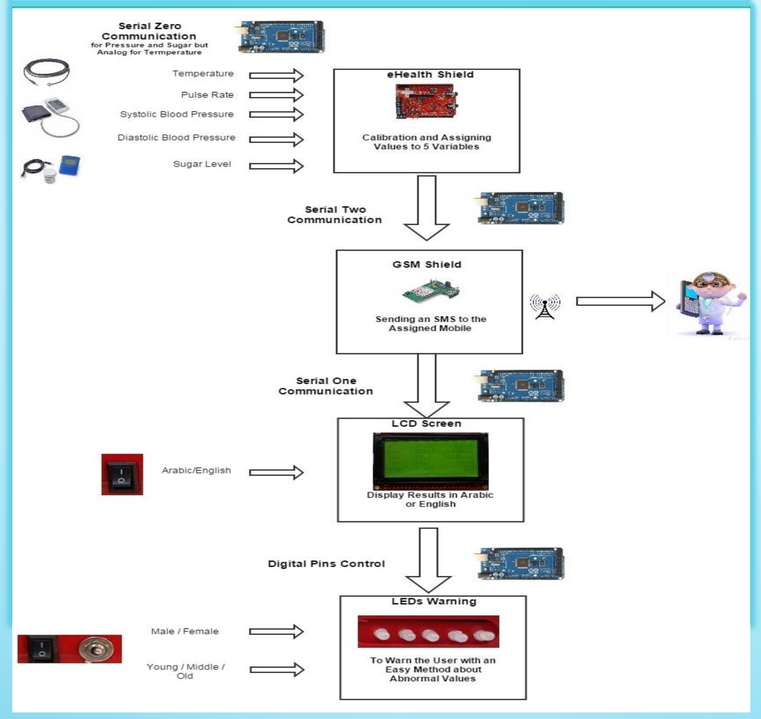


Tools used to determine customer needs including **surveys**, **visiting hospitals**, and the **literature review**.

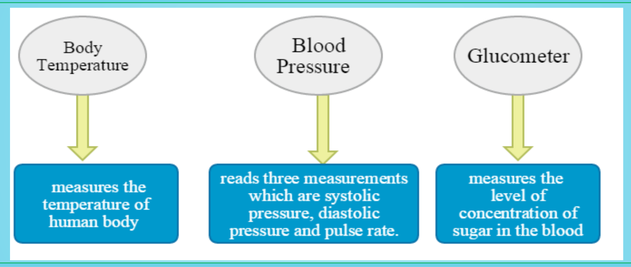
How the System Works

1) Three devices are taking five major values: Temperature, Systolic blood pressure, diastolic blood pressure, pulse rate, and sugar level.
2) The communication module turns on and connects through serial number two, and send an SMS message to physician's mobile number.
3) Turns off The communication module to avoid power Consumption and sudden failure of the system.
4) The screen displays information, based on language choice via witches.
5) Digital pins control the lighting of warning LEDs based on the other two switches.
5) The system ends.

System Block Diagram



Block#1 Data Acquisition


Body Temperature
Blood Pressure
Glucometer
measures the temperature of human body
reads three measurements which are systolic pressure, diastolic pressure and pulse rate.
measures the level of concentration of sugar in the blood

Block#2 Communications

- The system send the information of the patient to the doctor by SMS.
- A GPRS/GSM module is used to send the signal.
- AT commands is used for setting the GPRS/GSM module .
- The GPRS/GSM needs at least 2A to connect to a network aft er that the consumption decreases.
- Serial 2 is used in the Arduino Mega to communicate with GPRS/GSM module

The GPRS/GSM Module

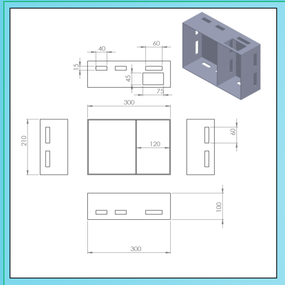
Block#2 Dual Language Display

•Default language for displaying will be Arabic language
• A switch is used to select English language display

Block#4 Light Warning Method

• System allows the customer to choose between Arabic or English language. After that, the customer will choose his\her gender (male or female). Then, he will choose his\ her age (old, middle age and children) all these stages by switches.
• by using LED for each measurements, with different colors (green=healthy, orange=not normal, red=emergency). So the patient cans now his medical satiation.

Product Prototyping



- The box was printed in FAB LAB.
- We use SOILDWORKS to design the box in 3D.

Project Findings

•Enhanced our engineering design skills.
•Body temperature, blood pressure. Heart pulse rate and glucose rate were the chosen vital-signals to acquire from the user.
•Dual language display system using serial graphic LCD.
•Warning system indicates health situation of the user.
•An automatic SMS message to a specified healthcare centre.
•The system was assembled and tested to be provided with a user manual.